

CALFED Bay-Delta Program Project Information Form
Watershed Program - Full Proposal Cover Sheet

Attach to the cover of full proposal. All applicants must fill out this Information Form for their proposal. Failure to answer these questions and include them with the application will result in the application being considered nonresponsive and not considered for funding.

1. Full Proposal Title: Implementation of Best Management Practices to Mitigate OP Pesticides Runoff

Concept Proposal Title/Number: Implementation of Best Management Practices to Mitigate OP Pesticides Runoff/ 0053

Applicant: Agricultural Research Consulting

Applicant Name: Gary L.

Obenauf

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Fiscal Agent Name (if different from above):

Fiscal Agent Mailing Address:

Fiscal Agent Telephone: _____ Fiscal Agent Fax: _____ Fiscal Agent Email: _____

2. Type of Project: Indicate the primary topic for which you are applying (check only one)

| | |
|--|-------------------------------------|
| <input type="checkbox"/> Assessment | <input type="checkbox"/> Monitoring |
| <input type="checkbox"/> Capacity Building | <input type="checkbox"/> Outreach |
| <input type="checkbox"/> Education | <input type="checkbox"/> Planning |
| <input checked="" type="checkbox"/> Implementation | <input type="checkbox"/> Research |

3. Type of Applicant:

| | |
|--|---|
| <input type="checkbox"/> Academic Institution/University | <input type="checkbox"/> Non-Profit |
| <input type="checkbox"/> Federal Agency | <input checked="" type="checkbox"/> Private party |
| <input type="checkbox"/> Joint Venture | <input type="checkbox"/> State Agency |
| <input type="checkbox"/> Local Government | <input type="checkbox"/> Tribe or Tribal Government |

4. Location (including County):

What major watershed is the project primarily located in:

☐ Klamath River (Coast and Cascade Ranges)
☒ Sacramento River (Coast, Cascade and Sierra Ranges)
☐ San Joaquin River (Coast and Sierra Ranges)
☐ Bay-Delta (Coast and Sierra Ranges)
☐ Southern CA (Coast and Sierra Ranges)
☐ Tulare Basin (Coast, Sierra and Tehachapi Ranges)

5. Amount of funding requested: \$ 400,000
Cost share/in-kind partners? X Yes No
Identify partners and amount contributed by each:
See notes on Budget.

6. Have you received funding from CALFED before? Yes X No
If yes, identify project title and source of funds:

By signing below, the applicant declares the following:

1. The truthfulness of all representations in their proposal
2. The individual signing this form is entitled to submit the application on behalf of the applicant (if the applicant is an entity or an organization)
3. The person submitting the application has read and understood the conflict of interest and confidentiality discussion in the Watershed Program Proposal Solicitation Package and waives any and all rights to privacy and confidentiality of the proposal on behalf of the applicant, to the extent provided in the Proposal Solicitation Package.

Printed name of applicant

Signature of applicant

1. Describe your project, its underlying assumptions, expected outcomes, timetable for completion, and general methodology or process.

Organophosphate (OP) pesticides, such as diazinon, chlorpyrifos, methidathion, and malathion, are of particular concern in the Central Valley because of the number of applications to dormant orchards (trees that are not leafed out). This “dormant spraying” controls a number of insect pests and typically occurs from December through February. During this period, as much as one million pounds of active OP ingredients are applied to 500,000 acres of almonds and stone fruits in the Central Valley (de Vlaming et al., 1999). Storm events that follow the OP pesticide applications can wash the recently applied pesticides into surface waters in concentrations toxic to sensitive invertebrates.

Ten years of monitoring by multiple agencies has demonstrated that stormwater runoff from orchards can result in elevated concentrations of OP pesticides in surface waters (de Vlaming et al., 1999). Monitoring conducted by the Central Valley Regional Water Quality Control Board (CVRWQCB) and the Sacramento River Watershed Program (SRWP) have identified aquatic toxicity caused by OP pesticides, principally diazinon, within the Sacramento River Watershed. Aquatic toxicity to *Ceriodaphnia* has been repeatedly documented during winter runoff periods in agricultural sloughs since 1992 (Foe and Sheipline, 1993; Larsen et al., 1998 a, b).

Irrigation and stormwater runoff have been tracked from the point of entry in the Central Valley to the San Francisco Bay in pulses of toxicity shown to be caused by diazinon. There is speculation that the decline in zooplankton, cladoceran and benthic invertebrate populations over the last several decades in the San Francisco Estuary, Delta and Sacramento-San Joaquin Basins may be related to the increase of pesticides in surface waters (Obrebski et al., 1992; San Francisco Estuary Project, 1997; Cooke et al., 1999). Invertebrate communities are necessary food items for nearly all of the priority fish populations in the Sacramento-San Joaquin basins during their early life stages (Eldridge et al., 1982; Schaffter et al., 1982; Brown, 1992; Moyle et al., 1992; Meng and Moyle, 1996; Lott, 1998; Nobriga, 1998). Dormant season spraying coincides with the time when these fish (including delta smelt, Chinook salmon, longfin smelt, splittail, steelhead trout, and green sturgeon) are in their early life stages (Cooke et al., 1999). The effects of pesticide-caused toxicity to aquatic communities are likely to be greater in wadable streams near the point where stormwater and irrigation runoff enters tributary waters that can be important nursery grounds for anadromous as well as resident fish species; even minute levels of contaminants can harm these communities.

Compounding the problem is the fact that today’s farming systems are complex and that whole systems must be addressed in order to influence a shift towards reduced risk pest control alternatives and management systems. Therefore, even though dormant applications of Diazinon will be this project’s primary target for change, this singular pesticide use cannot be viewed outside of the whole system.

Within a specific portion of the Sacramento or Feather River Watersheds, this proposed project will establish demonstration orchards that will tailor each commodity and grower with a feasible combination of pest management and site management programs capable of producing the desired result of reduced pesticide runoff into waterways. The project will serve as an augmentation to existing efforts within the region by elevating both cooperation and funding. Annual monitoring of appropriate

waterways will occur throughout the duration of the project. A monitoring protocol established by representatives from CVRWQCB, DPR, USGS, CDFG and SRWP will be applied to this project.

The tasks for this proposed project begin with the formation of a Management Team to guide its efforts from beginning to end. The Management Team will consist of participating SRWP OP Focus Group members plus other selected individuals with specific areas of expertise. Within the Sacramento and Feather River Watersheds, a specific area (sub-watershed) will be selected as the target for the project. This target area will be one that provides a high potential for impacting the diazinon runoff problem. Within the target area and incorporating NPS Management Measures, we will develop a demonstration program that is built around diazinon dormant applications but that also relates to other OPs and pesticides in general. A minimum of 10 orchard sites will be developed to involve the grower community in demonstrating that alternatives to dormant application of diazinon can be cost effective as well as effective in addressing pest management needs. Runoff management practices will also be demonstrated. In order to enhance the products of this project, we will coordinate our tasks with other reduced risk pesticide programs including the Prune and Almond industries PMA programs, the UC Davis pesticide/water quality project with CALFED, and a CWA 319(h) project currently underway in Butte County. Communication of the project goals, methods, and achievements, intended to reach the widest possible audience, will be accomplished via meetings, personal contacts, newsletters, mass media, internet websites and coordination with the outreach efforts of other reduced risk pesticide projects. We will ensure that an appropriate level of linkage is established with ambient monitoring efforts and companion monitoring projects directed by the SRWP, DPR and CVRWQCB. We will measure the success of our efforts by tabulating the records of pesticide use permits issued within the target area relative to the shift from OP pesticides to alternative materials. We will also utilize survey methods to quantify the degree of adoption of runoff management practices within the target area. Results will be communicated to the farming community and the impact of the program will increase with each succeeding year. Progress in completing these tasks and in achieving our goals will be reported quarterly. The tasks and their completion dates are shown on the CALFED Watershed Program Budget and Summary provided for question 3 below.

The impetus for this project is the need to convince the grower community to evolve to reduced risk programs by demonstrating cost effective pest and site management alternatives whose widespread adoption may preclude regulatory responses to limit or disallow the use of diazinon even in those instances when it remains the best alternative for pest management. It is anticipated that sufficient adoption of the reduced risk program will result in demonstrating that good surface water quality can be achieved and associated beneficial uses can be protected. Even then, it will take multiple years of continuous effort because of the different pest situations the grower community can experience from year to year. Our message will include an explanation of the urgency for adopting reduced risk programs. This will be a continuing part of our program and one that will evolve as new research results come forward. Support and direct involvement in the project by several different organizations will be essential including: commodity groups, UC Cooperative Extension, PCAs, and the OP Pesticide Focus Group (OPFG) of the SRWP stakeholder process.

A cornerstone of this project is its close ties with the efforts of the SRWP, a stakeholder group dedicated to stewardship of the Sacramento River Watershed. Stakeholders in the program include representatives of various government agencies, educators, and local citizen groups with economic, regulatory, aesthetic, or personal interests in the health of the watershed. The mission of the program is: *To insure that current and potential uses of the watershed's resources are sustained, restored, and where possible, enhanced, while promoting the long-term social and economic vitality of the region.* Pillars of the SRWP are: (1) a resource monitoring program; (2) an education and outreach program; (3) water quality management strategies for contaminants; and (4) providing information exchange and assistance for tributary watershed groups.

The SRWP OPFG is a broad-based stakeholder group¹ responsible for developing an OP pesticide management strategy (due for release July 2001) that will significantly decrease negative impacts of pesticides on the natural resources of the Sacramento and Feather River watersheds. This strategy will be based on tributary pesticide loading studies, monitoring of temporal concentrations of OP pesticides, and successfully implemented alternative management practices.² Development and implementation of this strategy will be a broad-based, watershed-wide effort. Once the menu of practices is developed, demonstration sites will be established in the watershed. Effectiveness of the practices in reduction of OP pesticide runoff and effects on aquatic life will be evaluated.

It should be noted that this project is only one piece of what is necessarily a multi-year, multi-disciplined, multi-focal effort on the part of diverse interests including the grower community, regulatory agencies, researchers, and environmental advocates. We will closely align and coordinate our efforts with other projects that share our stated water quality goals. It is anticipated that the products of this on-going process will be applicable to other watersheds including the San Joaquin Valley and Delta.

2. Describe your qualifications and readiness to implement the proposed project.

a. Describe the level of institutional structure, ability and experience to administer funds and conduct the project. Identify the fiscal agent responsible for handling the funds.

Agricultural Research Consulting (ARC) is a private consulting company that has been in business since 1994. The company is owned and operated by Gary L. Obenauf. Gary has over 30 years experience working with the dried fruit and nut industries in

¹ The OP Pesticide Focus Group has regularly attending representatives from: the Almond Board of California; the California Dried Plum Board; the California Tree Fruit Agreement; the California Farm Bureau Federation; California Plant Health Association; Dow AgroSciences; Syngenta Crop Protection; Butte, Glenn and Sutter County Departments of Agriculture Offices; CERUS Consulting (cover crop specialist); the Coalition for Urban and Rural Environmental Stewardship (CURES); G. Fred Lee & Associates; the State Water Resources Control Board; the University of California Integrated Pest Management Program (UC IPM) and Cooperative Extension Program (UCCE); the University of Maryland; the Department of Pesticide Regulation (DPR); the Department of Fish and Game (DFG); the United States Geological Survey (USGS); the Sacramento Regional County Sanitation District, and the Central Valley Regional Water Quality Control Board. The group is open to anyone wishing to participate.

² In accordance with the initial priorities identified by the group, the strategy will focus first on practices to mitigate OP pesticide runoff resulting from orchard dormant sprays. It is recognized that other sources of pesticide loading (e.g., irrigation drainage, atmospheric deposition, urban sources) to the watershed will need to be addressed.

California. Twelve years were spent as a UC Farm Advisor and Statewide Fruit Specialist, 11 years as Research Director and Technical Expert for the California Prune Board, the California Raisin Board and the California Walnut Board, and the last 8 years working as ARC. ARC serves as the Director of Research and Technical Expert for the California Dried Plum Board, hosts the “Annual International Research Conference on Methyl Bromide Alternatives and Emissions Reductions”, and serves as technical advisor for 8 research projects for the California Energy Commission related to production agriculture. For the past three years, Gary has been the project leader for Integrated Prune Farming Practices (IPFP). More detail on IPFP is presented in part c. below. Even though IPFP is larger in size, it requires basically the same degree of management as this proposal. Gary has been an active member of the SRWP OPFG since the beginning of this working group’s activity.

The structure of ARC is simple and efficient in that Gary has only one other employee to handle clerical and bookkeeping duties. ARC subcontracts out any function that cannot be handled efficiently within the company. Gary L. Obenauf will be responsible for handling the funds of this proposal. ARC is committed to making this proposal successful and agrees to the list of standard terms for receiving CalFed funding.

b. Describe technical support available (including support needed for environmental compliance and permitting) to begin and complete the project in a timely manner.

ARC is doing this project on behalf of the SRWP OPFG and will utilize technical expert support from UC Farm Advisors and from other OPFG stakeholders when needed, (see footnote 1 above). If areas are encountered that require technical expertise not available within the SRWP OPFG, help will be sought from appropriate institutions.

c. List any previous projects of this type you or your partners have implemented, funded either by CALFED or other programs.

IPFP is a pesticide use risk reduction project that has been helping the Prune Industry evolve to pesticide usage that presents less risk to the environment, field workers, and consumers of prunes. The project draws support from several sources including: California Dried Plum Board, California Department of Pesticide Regulation/Pest Management Alliance (PMA), UC/Biologically Integrated Farming Systems (BIFS), USDA/NRCS/EQIP and USDA/CSREES/IPM. Even though the primary focus of IPFP has not been OP runoff from dormant applications, most of the project’s work compliments this proposal by recommending many of the same management strategies being recommended by the SRWP OPFG.

This project will be coordinated with the Coalition for Urban/Rural Environmental Stewardship (CURES) proposal, “Promotion of Farming Best Management Practices and New Orchard Sprayer and Calibration Technology to Mitigate OP Pesticide Runoff into the Sacramento River and San Joaquin River Watersheds”. The CURES project, if funded, will acquire new orchard sprayers and calibration equipment for use in demonstration orchards. If the CURES project is not funded, we will use the growers current spray equipment. We will also coordinate with any other projects that CALFED staff identifies as potential collaborators with our efforts.

This project will also be coordinated with other projects of the SRWP OPFG. It compliments an already approved 319(h) project awarded to the California Dried Plum Board, "Implementation of Best Management Practices to Mitigate OP Pesticides Runoff", set to begin working this fall with prune grower community in the Gridley area. The project will implement management practices to mitigate OP pesticide runoff from orchards that exist within a subwatershed of the Feather River. The project will be coordinated through the SRWP OPFG, and like this proposed project, is intended to serve as a vehicle for implementing the management strategy the group is developing. The CWA § 319(h) project address prunes and a small block of peaches in the Butte County area. A key goal of this proposed project is to provide for implementation sites in other areas of the watershed and to work with other orchard commodities.

CALFED funded projects that have been or are currently working in this watershed include: (1) Project # 1997-C12, Evaluation of Alternative Pesticide Use Reduction Practices, conducted by UC Davis; (2) Project # 1998-C06, Water Quality Criteria for Chlorpyrifos and Diazinon (Designated Action), conducted by the DFG; (3) Project # 1998-B05, Salt Creek Watershed Project, conducted by the Colusa County RCD; and (4) Project #'s 1995-M06 and 1997-N20, Implementing Programs to Reduce the Use of Pesticides and Fertilizers in Sacramento and San Joaquin Watersheds (BIOS), conducted by Community Alliance for Family Farmers (CAFF).

US EPA funds support the SRWP and it's annual monitoring efforts in the watershed (pesticides, metals, conventional chemical parameters, pathogens and toxicity). Additionally, DPR funded winter 99/00 and 00/01 diazinon loading studies in the watershed coordinated through the SRWP OPFG. The State Board and CVRWQCB funded toxicity monitoring for the effort.

DPR Pest Management Grants and Pest Management Alliance Program funding has been dedicated to address the dormant spray issue in prunes, peaches and almonds in multiple counties in the watershed. The Glenn County Agricultural Commissioner's Office, through a CWA §205(j) grant, is managing the County of Glenn, Surface Water Stewardship Program. This program involves demonstration sites and outreach for reduced OP pesticide use and cultural practices to reduce runoff in orchards (including cover crops and filter strip research).

Numerous studies and projects have been conducted that relate, at least in part, to the OP pesticide dormant spray issue. The thrust of this project is to complement, not duplicate, these efforts by validating the management practices developed thus far and integrating the work to foster implementation in multiple commodities on a watershed basis. This goal will be facilitated by using the network of stakeholders in the SRWP OPFG and participants in many of the above referenced studies/programs.

3. Provide a completed budget cost sheet and describe the basis for determining project costs, including comparisons with other similar projects, salary comparisons, and other listed costs. Include all costs of environmental compliance, such as CEQA and/or NEPA, and permits. Describe how the approach to achieving the stated goals of the project demonstrates an effective cost relative to its anticipated benefits.

See attached budget summary and table.

4. Describe the technical feasibility of the proposed project.

a. Describe any similarity to previously implemented successful projects in this community or elsewhere.

IPFP has been very successful in helping the Prune Industry shift to a reduced risk pesticide use program. One measure of its success has been the reduction in dormant diazinon applications by over fifty percent. In working with the demonstration orchards, outreach, and education, this project will utilize the same basic approach used in the IPFP program. Refer to the tasks section of this proposal for specifics on the planned approach.

The approach outlined in this proposal contains a number of elements that have been used by the Community Alliance for Family Farmers in its BIOS programs (several of which have been conducted in the watershed). Specifically, cooperating growers will be enrolled, a project management team will be formed and will provide growers technical assistance in selecting and implementing the management practices appropriate to their sites and operations, demonstration sites will be established at these growers orchards, intensive pest monitoring conducted, and field days and newsletters used to disseminate project information to a larger audience.

b. If the project proposes a new approach or new method with a high likelihood of adding new knowledge and or techniques, or with the potential to fill identified gaps in existing knowledge, describe how it will do so, and what monitoring components will provide substantiation of results.

The approach of this project is being utilized by IPFP but is still a relatively new approach within the agricultural community. Bringing stakeholders to the table to deal with pesticide issues with their input and support has the potential to be very successful in the agricultural community. Early indications are that this approach can be successful. It is important to note that this project is building on previous efforts to reach a larger audience and take a more comprehensive approach. Where this project differs from previous projects of this nature is that it is being coordinated through an established watershed group (SRWP) and seeks to implement a water quality management strategy developed by this group on a watershed scale. Additionally, as a part of the management strategy, an comprehensive approach on practices is being taken, where the project management team will work with growers to select combinations of practices from a full suite of practices that includes alternative products or reduced use, runoff management practices, and application methods. The associated monitoring (weekly pest monitoring, pesticide use tracking, chemical monitoring, biological monitoring, and tracking adoption of given practices) conducted during this project will provide key information and assist the watershed group in refining the strategy through an adaptive management process.

Success of this approach will be substantiated via tabulation of pesticide use report (PUR) data combined with water quality monitoring data. Further declines in OP

pesticide usage coupled with reduced OP concentrations in surface waters will serve as evidence of success.

c. Explain how the finished project will be maintained as necessary, and to what degree it may require continued funding from outside the community.

This project is being coordinated through the SRWP OPFG, an established stakeholder group for the watershed. Its membership represents a broad network of researchers, agricultural consultants, local farm advisors, registrants, commodity board representatives and regulators who have established relationships with the grower community within the watershed. This will facilitate recruitment of demonstration sites. The education and outreach component will allow the grower community in the watershed to observe the effectiveness of practices and associated costs and benefits, thereby increasing the odds of their adopting the practices. Information will be provided and demonstrated to help growers determine which practices would be most appropriate for their operations, and how to implement those practices.

Agricultural production in California has a strong history of being adaptable to change and possessing a collective conscience for being progressive in terms of adopting new and better technologies; this is the primary reason for the success and magnitude of agriculture's contribution to this state's and the nation's economy. The primary goal of this project is to inform and aid the California grower community in their continuing evolution towards more efficient and more environmentally sound practices. Demonstrating to growers that their economies can be protected (or enhanced) via adoption of alternative practices will lead to improved water quality now and in the future. It should be noted that this process of promoting change for the benefit of environmental quality is a dynamic process fully anticipated to continue its evolution and adoption for the next 20 years and beyond.

If we determine at the end of this project that we have been successful in implementing SRWP OPFG recommended practices and these practices have helped reduce OP levels in surface waters, we will move on to new drainage areas in the watershed. If unsuccessful, we will try to determine why the approach was not successful in order to correct the situation. The Management Team will take an adaptive approach and make any adjustments necessary to ensure success in achieving our goals. Using IPFP and other similar projects as a yardstick, we anticipate it will take us 7-10 years to get most of the Sacramento Valley actively practicing the recommendations of the SRWP OPFG. The recommendations of the SRWP OPFG are presented as a living document that will continually be updated to reflect the experiences and knowledge gained from these demonstration projects as well as from continuing research efforts aimed at filling the data gaps that currently exist for the recommendations. Accordingly, demonstration and outreach projects will presumably evolve and become more refined in their content and approach.

5. Describe how the monitoring component of the project will help determine the effectiveness of project implementation and assist the project proponent and CALFED with adaptive management processes.

a. Identify performance measures appropriate for the stated goals and objectives of the project.

A performance guide for all monitoring will be at least a 30% improvement each year for PUR data and OP levels in surface waters receiving runoff from the study area. If the SRWP OPFG implementation practices are as effective as anticipated, surface waters within the study area should see a significant decline in the levels of OPs by the end of this project.

b. Describe how this project will coordinate with and support other local and regional monitoring efforts.

Monitoring protocols will be determined by a subgroup of SRWP OPFG and coordinated with the monitoring committee of SRWP. Members of our monitoring committee include members from USGS, DPR, G. Fred Lee & Associates, the Regional board, and others.

c. Provide a description of any citizen monitoring programs that will be part of this project.

Citizen monitoring will not occur as part of this project.

d. What monitoring protocols will be used, and are they widely accepted as standard protocols?

A chemical monitoring and reporting plan will be submitted to CALFED for approval. A Quality Assurance Project Plan (QAPP) for chemical monitoring will be prepared in accordance with the USEPA QAPs for Environmental Data Operations, QA/R5 Interim Final 5/94. The QAPP shall be approved by CALFED prior to the implementation of any sampling or monitoring activities. A monitoring and reporting plan was similarly prepared for obtaining baseline monitoring data for the CWA 319(h) project currently underway in Butte County.

Means of measuring improvements in this project will involve grower surveys and analysis of DPR pesticide use reports (PUR data). Additional measures will be chemical monitoring, physical habitat monitoring and benthic macroinvertebrate bioassessment. Analysis for OP pesticides will be conducted using approved US EPA methods. Physical habitat monitoring and bioassessment will be funded and conducted by the CVRWQCB, as a part of an existing effort, using an approach based upon the California Stream Bioassessment Procedure (CSBP) developed by the California Department of Fish and Game. The CVRWQCB began its physical habitat monitoring and bioassessment effort in the watersheds fall of 2000. This effort will be augmented to add sites in the proposed project area. Monitoring will be oriented toward determining the effectiveness of management measures. The physical habitat monitoring and bioassessment conducted by the CVRWQCB will also address ambient water and habitat quality.

e. Describe how the type and manner of data collection and analysis will be useful for informing local decision making?

Monitoring results will feed directly back into our outreach and education efforts to the grower community and the various agricultural industries participating in the project. It is anticipated that the results of monitoring will strengthen the further adoption of alternative practices as growers become aware of the success of their local and neighboring efforts. Specific local uses of the data will involve the outreach programs of University of California Cooperative Extension advisors, Agricultural Commissioners, and Resource Conservation Districts.

6. If this project is to develop specific watershed conservation, maintenance or restoration actions, describe the scientific basis for the action(s) described in the proposal. Include the following:

a. Any assessment of watershed condition(s) that has already been developed by you or others.

As previously stated in question 1, ten years of monitoring by multiple agencies has demonstrated that stormwater runoff from orchards can result in elevated concentrations of OP pesticides in surface waters (de Vlaming et al., 1999). Monitoring conducted by the Central Valley Regional Water Quality Control Board (CVRWQCB) and the Sacramento River Watershed Program (SRWP) have identified aquatic toxicity caused by OP pesticides, principally diazinon, within the Sacramento River Watershed. Aquatic toxicity to *Ceriodaphnia* has been repeatedly documented during winter runoff periods in ag sloughs since 1992 (Foe and Sheipline, 1993; Larsen et al., 1998 a, b).

Irrigation and stormwater runoff have been tracked from the point of entry in the Central Valley to the San Francisco Bay in pulses of toxicity shown to be caused by diazinon. There is speculation that the decline in zooplankton, cladoceran and benthic invertebrate populations over the last several decades in the San Francisco Estuary, Delta and Sacramento-San Joaquin Basins may be related to the increase of pesticides in surface waters (Obrebski et al., 1992; San Francisco Estuary Project, 1997; Cooke et al., 1999). Invertebrate communities are necessary food items for nearly all of the priority fish populations in the Sacramento-San Joaquin basins during their early life stages (Eldridge et al., 1982; Schaffter et al., 1982; Brown, 1992; Moyle et al., 1992; Meng and Moyle, 1996; Lott, 1998; Nobriga, 1998).

In 1998 the Sacramento River Watershed Program's (SRWP's) stakeholders identified organophosphate (OP) pesticides, along with mercury, as a priority issue in the Sacramento River watershed. The participants in the Toxics Subcommittee agreed that the presence of these pesticides in the rivers should be managed to protect aquatic resources and recommended that an OP pesticide management plan be developed as part of Phase IV of the SRWP (SRWP Water Quality Management Strategy: Background Information and Strategy Design, December 1999). Toxicity and diazinon concentration data collected throughout the Sacramento River system from the early 1990s indicate that diazinon toxicity, particularly in winter months when applications are made to dormant

almond and stone fruit orchards, could pose a threat to some aquatic organisms in the Sacramento River and its tributaries (SRWP Toxicants in Surface Waters of the Sacramento River Watershed, December 1998).

b. Previous assessment(s) used to establish your project goals and objectives, or to inform the basic assumptions of your proposal.

The SRWP assessment noted above is what was used to establish this projects goals and objectives. Additionally, a recent water quality monitoring project conducted on behalf of the SRWP OPFG showed that the main stem of the Sacramento River during the winter of 1999-2000 was in compliance with the USEPA/CDFG chronic toxicity criteria. This finding coincided with recent declines in the use of diazinon by as much as 50% in counties that are part of the watershed. Monitoring of the Feather River during the same period showed diazinon levels that exceeded the criteria following a number of storm events that presumably produced runoff from diazinon treated orchards and, as such, demonstrates that more than a reductin in diazinon usage must be accomplished. Our project goals include not only promoting more discretionary/reduced usage of diazinon, but also the adoption of site management techniques and application methods that are aimed at keeping pesticides on-site while minimizing runoff.

c. A description of the scientific assumptions used to develop the project goals, objectives and proposed actions, and the degree to which those assumptions are widely accepted (both in the science community as a whole, and in the watershed community).

The alternative practices suggested by the SRWP OPFG strategy are based on the best available scientific experience pertaining to alternative pest control practices, on-site management practices, and application technologies. The pest control alternatives were identified by a University of California study reported in 1999 (Zalom et al.) as being viable alternatives to diazinon dormant spraying. The on-site management techniques (vegetated filter strips, grassed waterways, etc) have proven to be effective in mitigating other pesticide impacts in other parts of the country. However, the SRWP OPFG has identified numerous data gaps and practices that need to be evaluated for their applicability and value under farming and climatic conditions that exist in California. This highlights an additional value of this proposed project, to field test the efficacy of suggested practices.

d. A discussion of how the proposed actions are (are not) consistent with the scientific assumptions and previous assessments completed in the watershed.

Assumptions are based on logic that the value of implementing the practices suggested by the SRWP OPFG will have varying degrees of efficacy under California situations. The goal is to identify those practices which have the greatest applicability and value, to eliminate those that prove less effective, and to refine the strategy relative to potentially complementary practices that will lead to the greatest reduction in diazinon levels in surface waters. Preliminary experiences such as those gained from the IPFP efforts in the watershed are encouraging.

e. A description of what baseline knowledge was used to support the management actions described in the proposal, or the likelihood that the management actions will generate more robust baseline knowledge.

Again, the sum of local watershed programs and associated experiences coupled with the scientific evidence for the efficacy of the practices that are part of this approach strongly suggest that more intensive implementation will lead to greater success. As previously stated, the additional experience gained from this project will feed back into the refinement of the proposed strategy as it is further adapted to fit the particulars of California watersheds and farming practices.

7. A. How will the proposal address multiple CALFED objectives (see Section I) in an integrated fashion, with emphasis on water supply reliability, water quality, ecosystem quality, and levee stability objectives CALFED has established for Stage 1 of the program?

This proposal represents a complete integration of efforts to 1) provide education and outreach to the farming community, 2) augment the efforts of the scientific community to address numerous data gaps, 3) inform the regulatory community with sound scientific monitoring protocols, and 4) help refine the current products and processes of local watershed efforts.

CALFED objectives for improving aquatic habitats and water quality are directly influenced by any success that this project may achieve. By working in close collaboration with the multiple stakeholders who participate in the SRWP OPFG process, this project will definitely facilitate the efforts of that group while availing itself to the wealth of expertise afforded by this close relationship. The monitoring component of this project has already been crafted and was implemented during the winter of 2000-2001 with the full backing of the stakeholder group. One example of coordination with other CALFED program elements is the close ties this project has with the UC Pesticide/Water Quality interdisciplinary approach that is currently funded by the CALFED Ecosystem Restoration Program. The strengths of the SRWP stakeholder process offer good assurance that efforts of this sort will continue beyond the scope of this project.

B. Explain how the proposal will help define and illustrate relationships between watershed processes (including human elements), watershed management, and the primary goals and objectives of the CALFED (see Section I).

A key component of this project is elevating the awareness of the grower community regarding the sensitivity of surface waters and associated habitats and life processes to the off-site movement of pesticides. In general, the farming community in California is already sensitive to the fragility of the environment and many of the linkages that exist between various ecosystem components. The potentially far reaching downstream impacts of any contaminant must be conveyed. By coordinating this particular effort with offering and demonstrating alternative practices, significant

adoption of the practices is more likely. Growers will be further advised that in the absence of self-determined remedies being significantly implemented, regulatory responses are unavoidably the next approach to addressing the issue.

C. Identify a lead agency for environmental compliance, such as CEQA or NEPA. Describe the program's strategy and timetable on environmental compliance.

Central Valley Regional Water Quality Control Board (CVRWQCB).
CVRWQCB will file a notice of exemption with the State Clearing House within 3 months of notification of this project being funded.

8. Describe any other important aspects of your program that you could not address in the above items, and that you feel are critical to fully describing your project.

The alternative practices suggested by the SRWP OPFG that will be offered for implementation in this project are as follows:

Selection of Pest Management Strategies

Field Scouting for Insects – base decisions on scouting and economic thresholds

Chemical

No Dormant Spray, In-Season as Needed

OP Dormant Applications

Alternate Year Dormant Applications

Bloomtime bt Sprays

Spinosad + Oil as a Dormant Spray

Conventional non-OP pesticides as Dormant Sprays

Pheromone Mating Disruption

Evaluate toxicity and run-off potential when selecting product

Beneficial Insects

Release Beneficial Insects

Provide Habitat (cover crops, insectary shrubs)

Conserve Beneficial Insects (evaluate timing and toxicity of products to minimize effect on beneficial insect populations)

Other Strategies

Spot Treatment of Infestations

On-site Practices for Runoff Reduction

Cover Crops

Vegetative Filter Strips

Reducing the Bare Conduit

Grassed Roadways Bordering Orchards

Grassed Waterways

Water & Sediment Control Basins

Drainage System Maintenance to Protect Surface Water

Willow-post Method to Control Streambank Erosion

Avoiding Channelization of Streams and Creeks
Berms at Low Ends (sandy soils, low slope)

Application Methods

Application Rates and Spray Volume
Sprayer Calibration, Nozzle Selection
Direct Injection and Closed Handling Systems
New Equipment Technology
Aerial vs. Ground Spray
Setback Zones
Drift Mitigation Practices
Proper Mixing, Loading, and Disposal Practices
Equipment Repair and Maintenance

CALFED WATERSHED PROGRAM BUDGET AND PROJECT SUMMARY

| Task Description | | Completion date | Match funds | CALFED funds | Total |
|---|---|-----------------|------------------|------------------|------------------|
| Task 1: | Administration: | Dec. 04 | \$75,000 | \$102,500 | \$177,500 |
| <i>Task 1a:</i> | Project oversight, record keeping, meetings, communications | Dec. 04 | 25,000 | 25,000 | 50,000 |
| <i>Task 1b:</i> | Formation of Management Team | Jan. 02 | 5,000 | 5,000 | 10,000 |
| <i>Task 1c:</i> | Coordination with other programs | Dec. 04 | 10,000 | 10,000 | 20,000 |
| <i>Task 1d:</i> | Identification of study area | Jan. 02 | 5,000 | 2,500 | 7,500 |
| <i>Task 1e:</i> | General Overhead 15% | Dec. 04 | 30,000 | 60,000 | 90,000 |
| Task Product(s): Minutes of Management Team meetings, field meeting information, copies of educational materials, name project manager and management team members, and identify area of project. | | | | | |
| Success Criteria: Accomplish the above tasks by time schedule. | | | | | |
| Task 2: | Demonstration Orchards: | Dec. 04 | \$250,000 | \$232,500 | \$482,500 |
| <i>Task 2a:</i> | Identify growers in study area for demonstration orchards | Mar. 02 | | 2,500 | 2,500 |
| <i>Task 2b:</i> | Set up demonstration orchards | Mar. 02 | | 10,000 | 10,000 |
| <i>Task 2c:</i> | Monitor pests | Dec. 04 | | 220,000 | 220,000 |
| Task Product(s): Name cooperator growers, inform growers of implementation practices, and monitor pests weekly. | | | | | |
| Success Criteria: Accomplish on time schedule, growers will to use implementation practices. | | | | | |

| | | | | | |
|-----------------|---|----------------|-----------------|-----------------|-----------------|
| Task 3: | Dissemination of information | Dec. 04 | \$12,000 | \$12,000 | \$24,000 |
| <i>Task 3a:</i> | Utilize appropriate information transfer, ie newsletters, meetings, personal contacts and etc. | | 10,000 | 10,000 | 10,000 |
| <i>Task 3b:</i> | Coordinate information with SRWP and CURES. | | 2,000 | 2,000 | 2,000 |
| | Task Product(s): Produce information about the project and get the information to the growers of the commodities involved in the project. | | | | |

Success Criteria: Quality of information products.

| | | | | | |
|-----------------|---|----------------|-----------------|-----------------|-----------------|
| Task 4: | Monitoring | Dec. 04 | \$27,500 | \$45,000 | \$72,500 |
| <i>Task 4a:</i> | Develop monitoring plan and quality assurance project plan. | | 2,500 | 5,000 | 7,500 |
| <i>Task 4b:</i> | Coordinate monitoring with watershed and other demonstration sites. | | 2,500 | 2,500 | 5,000 |
| <i>Task 4c:</i> | Chemical monitoring. | | 20,000 | 35,000 | 55,000 |
| <i>Task 4d:</i> | Spatial and temporal aspects of monitoring. | | 2,500 | 2,500 | 5,000 |

Task Product(s): Monitoring plan, monitoring results and quality assurance plan.

Success Criteria: Improvements of monitoring results over time.

| | | | | | |
|-----------------|--|--------------------|----------|----------------|----------------|
| Task 5: | Evaluation/Reporting and Presentations | Mar. 05 | 0 | \$8,000 | \$8,000 |
| <i>Task 5a:</i> | Quarterly progress reports: Progress reports on project implementation, including financial status, milestones reached, products completed, and general assessment of overall progress, including problems encountered or anticipated. | Each quarter 02-04 | | 6,000 | 6,000 |
| <i>Task 5b:</i> | Draft final report: Draft report summarizing the project implementation, achievements, product deliveries, financial status. To be sent to the Contract Manager for review and comment. | Feb. 05 | | 1,000 | 1,000 |
| <i>Task 5c:</i> | Final report: Revised report incorporating comments from the Contract Manager and others. | Mar. 05 | | 500 | 500 |
| <i>Task 5d:</i> | Presentations: Delivering at least one final summary presentation to CALFED. | As needed | | 500 | 500 |

Task Product(s): Various progress and final reports.

Success Criteria: Quality of report...what it has to say and how said.

Matching Funds
\$250,000 This is a modest valuation of the land, labor and equipment resources anticipated to be provided by cooperating growers within the study area plus a conservative estimate of support from SRWP OPFG to the project.

\$75,000 Central Valley Regional Water Quality Control Boarb (CVRWQCB) funds to augment the chemical monitoring for this project.

Physical Habitat Monitoring and Bioassessment Sites in the project will be added to an existing CVRWQCB program of phisical habitat monitoring and benthic macroinvertebrate bioassessment. The work will be funded and conducted by the CVRWQCB. Scientific collection permits required for this work will be acquired by CVRWQCB.

California Prune Board CWA § 319(h) Project **\$350,000** The proposed project is a companion project for the CPB project and will seek to foster implementation of the SRWP OP pesticide management strategy in the Sacramento and Feather River watersheds. As such, outreach and education efforts will serve common goals for both projects.

| Task Description | Labor Rate* | Hours | Total Labor | Supplies | Travel | Materials | Sub- contract** | Match | CALFED | Total |
|---|-------------|--------|-------------|----------|----------|-----------|--------------------|-----------|-----------|-----------|
| Task 1: Adminstration | \$50 | 3,430 | \$171,500 | \$3,000 | \$3,000 | | | \$75,000 | \$102,500 | \$177,500 |
| Task 2: Demonstration Orchards | \$25 | 19,260 | \$481,500 | \$6,000 | \$10,000 | | | \$250,000 | \$247,500 | \$497,500 |
| Task 3: Dissemination of information | \$30 | 783 | \$23,490 | \$510 | | | | \$12,000 | \$12,000 | \$24,000 |
| Task 4: Monitoring | \$30 | 1,833 | \$54,990 | \$40 | | | | \$25,000 | \$30,000 | \$55,000 |
| Task 5: Evaluation/ Reporting and presentations | \$45 | 159 | \$7,155 | \$480 | \$335 | | | \$0 | \$8,000 | \$8,000 |
| Totals: | | | \$738,666 | \$10,030 | \$13,335 | \$0 | \$0 | \$362,000 | \$400,000 | \$762,000 |

*Provide benefits/salary percentage here

**Provide a separate itemized budget using this format for subcontracts